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Determinants of Student Dropout in Cambodia's Primary and Lower Secondary Schools: *A Survey of Program Interventions*

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Abstract

This study finds out determinants of student dropout in both Cambodia's primary and lower secondary schools. It also surveys program interventions used to mitigate dropout issue in other countries and Cambodia. Over ages students, working students and students from large family size are more likely to drop out of school. If student works for additional one hour from the average working hour, the probability of dropout increases by around 5% at primary level and 12% at lower secondary level. Working students tend to drop out of school when they graduate from primary school and are about to enter the lower secondary school. Share of household expenditure on education also plays important role to have an effect on student dropout. It is found that a higher share of household expenditure on education decreases the probability of school dropout. The policy implication from this finding is that if a scholarship is given directly to cover education expenditure, it will likely help reduce dropout headcount. Nevertheless, other interventions including school and teacher quality improvements should be also complementarily implemented to achieve quality education outcomes for students.

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1. Introduction

Cambodia considers its educational reform as one of the top priority policies. Since the first election in 1993, gradual educational reforms have led to impressive enrolment and low dropout rates for both genders at the primary level. These achievements are more satisfactory than the target rates of the Education Strategic Plan (ESP) of the Ministry of Education Youth and Sport (MoEYS). Nevertheless, dropout incidence at the lower secondary level is still a significant concern for Cambodia's education. In 2013, one in five students dropped out of school after primary school completion, which is almost twice higher than the target rate of 13% set by the ESP. Furthermore, this dropout rate was on an upward trend from about 12% in 2003 to around 23% in 2011, with significantly higher female dropouts causing another policy concern on gender disparity in education.

On the positive side, the last few years saw a slight decline of primary level dropout rate and a steady lower secondary dropout rate. This favorable trend can be sustained with effective policy interventions. The value of education can never be underestimated as Cambodia is moving towards regional and global integration, particularly the 2015 ASEAN Economic Community, when freer labor movements are expected to intensify. This study, therefore, investigates the issues surrounding school dropout incidence at both primary and lower secondary levels. It addresses several aspects of school dropout, using a mixed approach of both qualitative and quantitative methodologies with available data from Cambodia Socio-Economic Survey (CSES) and literature reviews on various types of program interventions. Findings from this study could shed light on the significant policy options to tackle dropout issue in Cambodia.

This paper is divided into 6 sections. The following section summarizes the literature review while Section 3 gives an overview of scholarship support programs in Cambodia. Section 4 illustrates data and methodology. Section 5 covers the analysis and findings from CSES. Finally, section 6 is the conclusion and policy recommendations.

2. Literature Review

This part summarizes and reviews factors contributing to dropout incidence and the program interventions implemented by both government and development partners. Particular focuses of this literature review are the compilation of outcomes and effectiveness of each program intervention designed to retain students at school and improve their study outcomes.

Factors Leading to Student Dropout

Education is an investment in human capital because of the expected benefits in return (Mincer, 1958; Becker, 1964). People go to school because they believe in the dividend return they will deserve for a better future life. Nonetheless, not all people successfully complete their education. Some drop out from school for various reasons. Research studies have found many factors affecting the school dropout. Those factors can be grouped as (1) student factors, (2) family factors, (3) school factors, and (4) regional, community, country factors. The student factors include the attribute factors such as gender, ethnic, racial, peer context characteristics, student performance1, attitude, behaviours and background (Diyu, 2002; France, 2008; Heckman &LaFontaine, 2010; Rumberger, 2011; Jordan, Kostandini, &Mykerezi, 2012). The family factors are involved with family size, poverty, parents' education and so forth (Suliman& El-Kogali, 2002; Ana &Verner, 2006; Montmarquette, Viennot-Briot, &Dagenais, 2007; Huisman& Smits, 2009). On the other hand, the school factors could include school quality, curriculum, school regulation and teacher quality2 (McNeal, 1997; John, 1998; Huisman& Smits, 2009). The geographical factors include urban and rural area, the distance from school to student's house, local infrastructure and others (Huisman& Smits, 2009; Jordan, Kostandini, &Mykerezi, 2012). Finally community, regional and country level factors are related to the political stability, economics crisis, recession,

[1]Roderick (1993) and Rumberger (2001) show that students who experience academic difficulty had an elevated risk of dropping out. It is believed that dropping out from school can be explained as the culmination of a process of progressive disengagement with the academic and social dimensions. For some students the process starts much earlier event at elementary school (Rumberger 1987, 2000; Finn 1989; Newmann, Wehlage, and Lamborn 1992; Garnier, Stein, and Jacobs 1997).

[2] In Cambodia, by using focus group discussion with parent, some studies found that because many parent think that teacher did not teach their children well. They think that it is a waste of time for their children because children are going to get nothing from the class. Therefore, parents decide to have their children dropped from school.

government supports and program on education, unemployment and others (Ravallion& Quentin, 1999; Dre`ze&Kingdon, 2001; Huisman& Smits, 2009; Jordan, Kostandini, &Mykerezi, 2012).

In Cambodia, there are some studies trying to empirically asses factors having impacts on school dropout. Keng (2005) conducts field survey on household and children in two rural villages of Pursat province in order to investigate the decision making on education when the poor have to balance between future welfare and immediate needs. The results show that in rural area, where parents are illiterate and children contribute to economic production of the family, students are left to decide whether to contiue their education after having enrolled in school for sometimes. Fata and Hirakawa (2012) also study factors affecting school dropout in rural area. The survey was conducted in Kompong Cham province through the stratified sampling on five primary schools and five lower secondary schools based on dropout rate to examine the school factors. Totally 868 students from first, fourth and seventh grade are included in the sample. The study shows that students who are overage, have poor academic achievement, come from Champ ethnic and with parents who have low aspiration on education, are likely to drop out. Bunchhay, Fata, Sopha, and Hirakawa (2014), using similar method to Fata and Hirakawa (2012), they found that teacher's absence, mother's education, repetition, parent living far away, and loss of parent affect school dropout in rural primary school.

For this research study, differently it extends from previous researches on school dropout by using the richer dataset of Cambodia Socio-Economic Survey (CSES) which covers 24 provinces across Cambodia. The immense size coverage of the CSES may give us better generalized pictures i.e. the validity and the inference on characteristics of the school dropout in Cambodia.

Program Interventions, Outcomes and Effectiveness

The literature reviews above reveal several factors leading to school dropout ranging from student, to family, to community and to national level factors. For each factor, relevant policy intervention could be carried out to address the school dropout accordingly. There is a comprehensive study review on program intervention on school dropout through School Dropout Prevention Pilot (SDPP) program, funded by USAID for four countries, namely

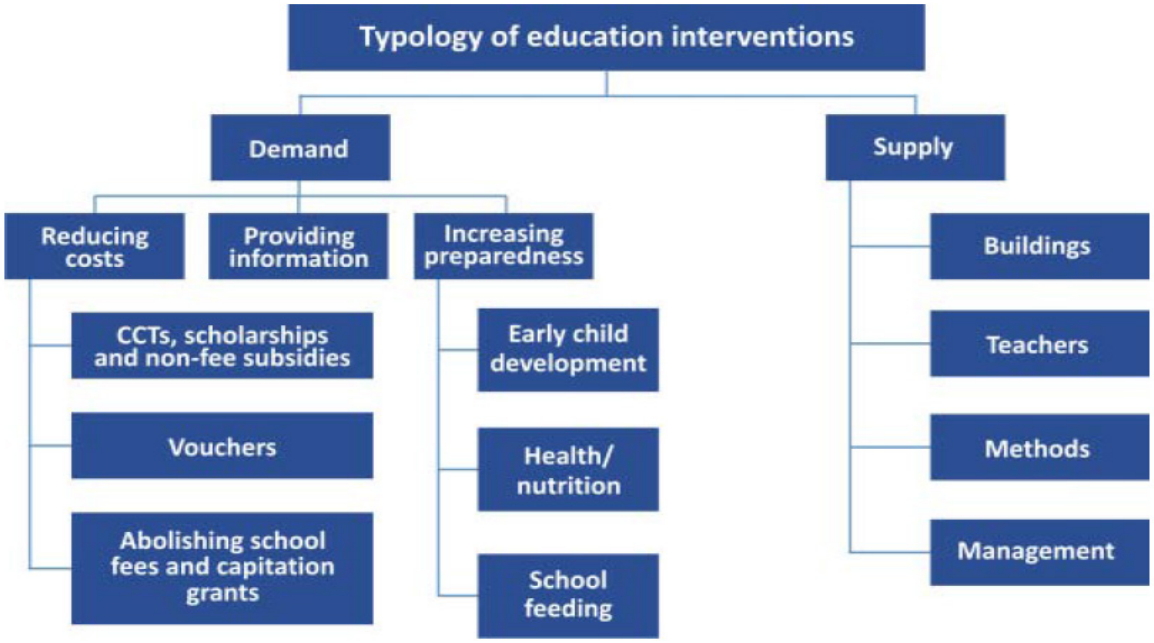
Cambodia, India, Tajikistan, and Timor Leste. Review findings show that in general the program intervention to tackle school dropout can be categorized as follows (See Lorie, Jennifer, &Rajani, 2011):

- Academic intervention: help student to achieve better school performance and achievement. As indicated above, some of the dropout reasons could come from the student performance and thus academic intervention is relevant to be done
- Financial intervention: help students and family to cope with school payment. As it is widely believed, poor students are prone to dropout since they face not only direct cost of education but also the opportunity cost (by working to earn income for the family)
- Health intervention: target students whose poor health could lead to dropout
- Personal and Social Intervention: deal with attitude and behavior using approaches such as group discussion, peer counseling and mentoring
- Structural intervention: target and connect community level, school level, provincial level and national level together.

This report reveals that among these five interventions, financial intervention resulted in a positive change in 12 of 13 cases (92%), followed by successful structural intervention with three of four cases (75%). Academic intervention was successful in two of four cases (50%), while health intervention had an impact on educational outcomes in two of five studies (40%). Personal and social support were also successful, but it needs to be compelled with other interventions at the same time. Besides this evaluation review, studies by (Ricardo, Kwame, Jo, & Frances 2010) and (France 2008) also suggest similar categories of policy intervention as those indicated by SDPP. Those interventions may be grouped as follows: school related measures, financial and other measures (health intervention, community involvement, adult education program, etc).

In addition, Shari et al (2013) also carry out the systematic review and impact evaluation which analyses and synthesizes all relevant evidences about a specific intervention on enrolment, dropout and education outcomes. They presented a new categorization of supply and demand-side intervention and drew out lessons on each intervention type from the 24 high-quality evaluation studies (see Figure 1).

Figure 1: Supply and Demand Side Approach to Education



Source: Shari et al (2013), page 04

Traditionally, education intervention has centered on supply-side of learning materials, school building and teacher quality. More recently, increasing attention has also shifted to the demand-side intervention. Demand-side intervention consists of three major categories, namely (1) Reducing Cost (2) Providing Information and (3) Increasing Students' Preparedness. There are different intervention types in the first and third categories. Scholarship and conditional cash transfer support is grouped in the first category as it helps ease education expenditure for students. The synthesis conclusions of the report can be summarized as below (see Table 8in the Appendix on the overall pooled effect sizes by outcome and intervention type):

- Scholarship/ conditional cash transfer could increase school enrolment and attendance, but have no overall effect on students' test scores. However, the evidence base is not that broad for learning outcomes
- Enrolment and progress in school are improved by school fee subsidies, while merit-based scholarships boost learning
- There is no effect on school attendance and language test scores of students in case of distributing teaching and learning aids in school. Yet, it yields positive impacts on mathematics test scores for computer-based learning and the regular school curriculum interventions
- It looks promising in boosting schooling outcomes for interventions including teacher investment, new schools, early childhood development program, community-based school management and school-feeding programs.

3. Scholarship Support Programs in Cambodia

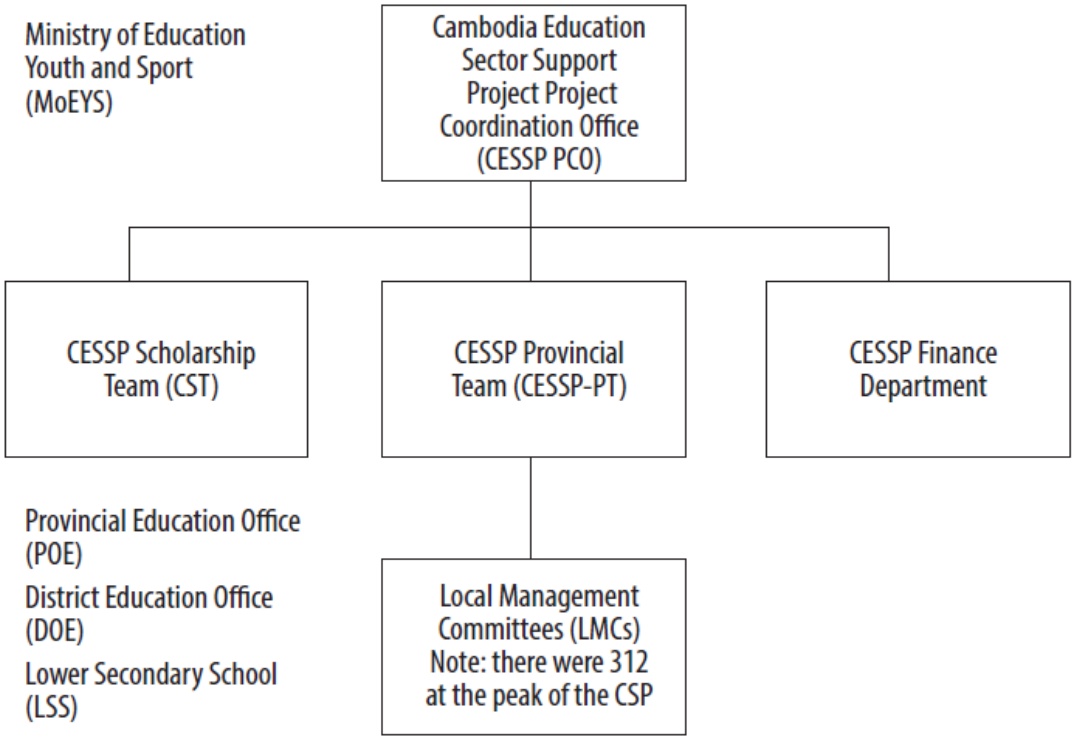
There are numerous scholarship supports in Cambodia, both in cash and in-kind payments. The scholarships have ranged from government, development partners and individuals, varying from a small number of students to the complete coverage. One major pioneering project was funded by the Japan Fund for Poverty Reduction (JFPR) to provide scholarships to lower secondary students. This scholarship program aimed at increasing student enrollment and reducing the dropout numbers. The project was designed specifically for female students from poor family and covered school year from 2003 to 2006.

The JFPR is a kind of Conditional Cash Transfer (CCT) program which has been widely implemented and evaluated in many Latin American countries. In Cambodia, JFPR provided scholarship of $45 each for female students at lower secondary schools. Female students are automatically qualified for up to 3 years at their schools when they are awarded the scholarships given the conditions that they maintain a passing grade are absent without "good reason" less than 10 days in a year. However, there is no mechanism to ensure their promising agreement is enforced. Scholarship recipients only agreed to use funds for their education. The evaluation impacts of the JFPR show that it raises school attendance

approximately 30 percentage points higher than those without the project support. The results also reveal the robust evidence of heterogeneous treatment effect in case of Cambodia. Female students with low socio-economic status, low parental educational level and living far away from schools see the largest positive effect on their enrollment and attendance from this JFPR project (Deon Filmer & Norbert Schady, 2006).

Along with JFPR projects, there are also other scholarship support projects including the Royal Government of Cambodia's Priority Action Plan (PAP12); and the Basic Education and Teaching Training (BETT) project of Belgian Technical Co-operation. The projects are very similar in design and purposes. Drawing upon the lessons learnt of those projects, the Cambodia Education Sector Support Project (CESSP) was supported and funded by the World Bank. Among objectives to increase enrollment rate and reduce dropout rate of the poor students at lower secondary schools, the project included the setting up of the program called CESSP Scholarship Programme (CSP) with the initial budget of US$ 5,840,256. The CSP covered five school years from September 2005 to July 2010 and included two scholarship amounts i.e. $60 per year for the poorest recipients and $45 for the others (Poisson, 2014). It is noteworthy that to ensure there is a single and consistent MoEYS-run scholarship program, CSP took over the JFPR and BETT scholarship programs in 2007, when the World Bank was the only fund provider. However, the JFPR and BETT still continued their funds to other education initiatives. To implement the CSP program, the Local Management Committee (LMC) was established to select scholarship recipients and administer the scholarship distribution (see Figure 2 below on CSP program administrative structure).

Figure 2: CSP Program Administrative Structure



Source: (Poisson, 2014), page 107

The impact evaluation study of this CSP program by Marcus (2013) in the World Bank's policy note indicates that:

- The scholarships had a significant impact on student enrolment and attendance in Grade seven and Grade eight. The impact was not different between girls and boys
- Providing students with the amount of $45 to stay in school proved as effective as giving them the amount of $60
- The grants could be used on anything and how it was used was not tracked. However, families that received funds spent more money on school related expenses
- Scholarship awardees were less likely to continue/leave for work while attending school; and their siblings did not have to make up the difference in compensation for families
- While funds increased enrolment among vulnerable students, it did not prove to achieve better outcomes.

The final conclusion of the evaluation paper gives an additional suggestion that staying in school is not always adequate to ensure a quality education. Besides the scholarship support program of demand-side interventions, other interventions including school and teacher quality improvements should be also complementarily implemented to achieve quality education outcomes for students.

There is also another scholarship program supported by GPE (Global Partnership for Education). It provided scholarship with the amounts of $2,100,000 per fiscal year 2014-2015. About 70,000 poor and good performing students received US$ 30 per year. Most of them are selected based on the Ministry of Planning's ID Poor 1 and ID Poor 2. The coverage is 24 provinces, particularly those who are not covered by other scholarships. However, from school year 2015-2016, the Cambodian government will cover the scholarships with its own budget. A number of draft documents[3] suggest that to upcoming government scholarship program to be finalized by 2015 will extend the scholarship from Grade four in the primary school to Grade nine in the upper secondary school so as to reduce the high dropout incidence during the student transition from the primary to lower secondary school.

In case of the primary school, on the other hand, two cash and in-kind programs are supported by the World Food Programme (WFP) and government:

- School feeding program: breakfast for all students at selected primary schools from Grade one to Grade six including kindergarten located in those primary schools. The program runs for 10 months/year and covers 385,000 students in 12 provinces.
- Scholarship (10kg of rice/months OR 20,000 Riels/month) for 10 months/year in 15 provinces. This is done only for ID Poor 1 and those qualified similar to ID Poor 1 based on identification tools adapted from Ministry of Planning and following confirmation with community and schools. It is being delivered to 97,000 students in Grade four to Grade six.

[3]This scholarship information was drawn upon the informal consultation with MoEYS officials in charge of scholarship support program. However, the finalized scholarship scheme and its coverage might be subject to change.

It is noted that the Cambodian government contributes around 2,000 tonnes of rice to WFP for these programs annually.

4. Data Sources and Methodology

This study mainly uses the Cambodia Socio-Economy Survey (CSES), which is conducted by the national institute of statistics (NIS) of the Ministry of Planning. In this study, CSES 2003, CSES 2007, CSES 2009, CSES 2011, and CSES 2012 are used to analyze the dropout in Cambodia since they have tractable link and consistent questionnaires, allowing for the comparison of school dropout over the years. CSES before 2003 are excluded from the analysis because they do not have consistent questionnaires with CSES after 2003.In addition, other sources are also used to retrieve relevant information for the analysis such as Education Management Information System (EMIS) data, data from international institutions such as UNICEF, UNESCO, World Bank and others.

For the methodology, Probit and Logitregression methods are used to investigate the characteristics of dropout and its determinants. Three set of variables are controlled in the regressions: (1) individual characteristics, (2) family characteristics and (3) school and community contextual factors. The regressions are applied separately to primary school's dropout group and lower secondary school's dropout group, and further classified into Cambodia, Urban, and Rural Areas.

Following Ana and Verner (2006), the model is used to estimate the effect of each determinant on the probability of dropout with the following specification.

$$outofschool_i^* = \boldsymbol{X_i}\boldsymbol{\beta} + u_i \qquad (1)$$

Where $\boldsymbol{X_i}$ is a vector of explanatory variables including individual characteristic, family and community contextual factors and u_i is the error term (uncontrolled factor that can affect ($outofschool_i^*$). We do not observe $outofschool_i^*$ but we observe the child actually drops out if $outofschool_i^* \geq 0$ and a child is still at school if $outofschool_i^* < 0$, we can write:

$$dropout_i = \begin{cases} 1, & if\ outofschool_i^* \geq 0 \\ 0, & if\ outofschool_i^* < 0 \end{cases} \qquad (2)$$

It is possible to regard $outofschool_i^*$ as the net benefits or net utility of dropping out of school (benefits after offsetting the cost of dropout). We do not know exactly the magnitude of the net benefit, but we know that if the net benefit of dropout from school is positive ($outofschool_i^* \geq 0$), the child decides to drop out, and we observe that the child is currently a dropout. However, if the net benefit of dropout from school is negative ($outofschool_i^* < 0$), the child decides to stay in school, and we observe that the child is currently in school (despite the child is a part-time worker or having regular absence). Because $dropout$ takes value 1 (dropout) and 0 (non-dropout), the probability model fits well for the estimation. The probability of student dropout can be written as follows:

$$P(dropout = 1) = P(outofschool_i^* \geq 0)$$

$$= P(\boldsymbol{X_i\beta} + u_i \geq 0)$$

$$= P(-u_i < \boldsymbol{X_i\beta})$$

$$\boldsymbol{P(dropout = 1) = F(X_i\beta)} \quad (3)$$

Where $\boldsymbol{F}(\,.\,)$is a cumulative density function of u_i, the Probit model is used if the error term $u_i$follows a cumulative standard normal density function, and the Logit model is used if the error term u_i follows a logistic distribution function. We estimate equation (3) with both Probit and Logit models.

5. Analysis and Findings

Descriptive Statistics on Dropout

Using the information from CSES, the dropout is defined as students who used to be in school, that is ever attended school and who is not currently in school system. This

definition distinguishes dropouts from children who never attend school. This definition is consistent with UNESCO's and MoEYS's definitions. Only individuals whose ages are equal to or less than 16 at the time of interview are counted as dropouts since we focus on dropout incidence at primary and lower secondary school. In Cambodia, students who go to school at the age of 6 are expected to finish primary school at age 12 and finish lower secondary school at age 15 or 16. Moreover, if a child is on holiday, he or she is considered as in the school system.

Figure 3: Dropout Rate at Primary School from 2003-2012

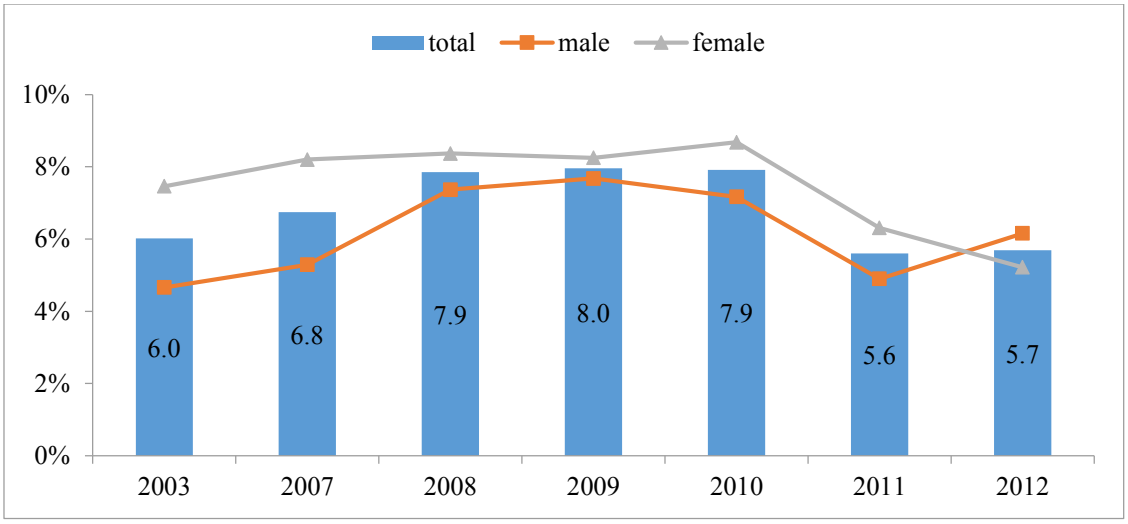
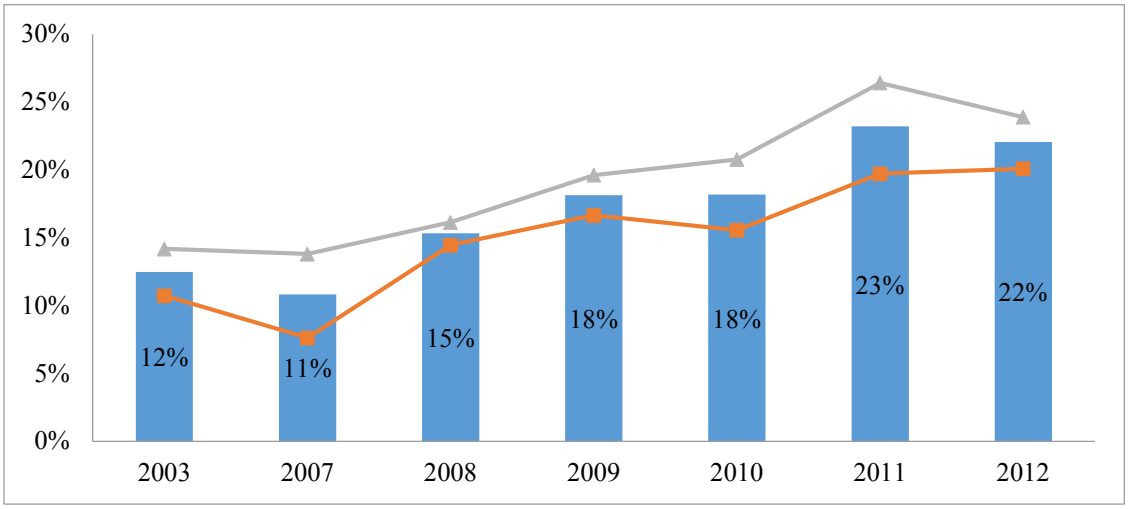


Figure 4: Dropout Rate at Lower Secondary School from 2003-2012



Source: Author's calculation from CSES 2003-2012

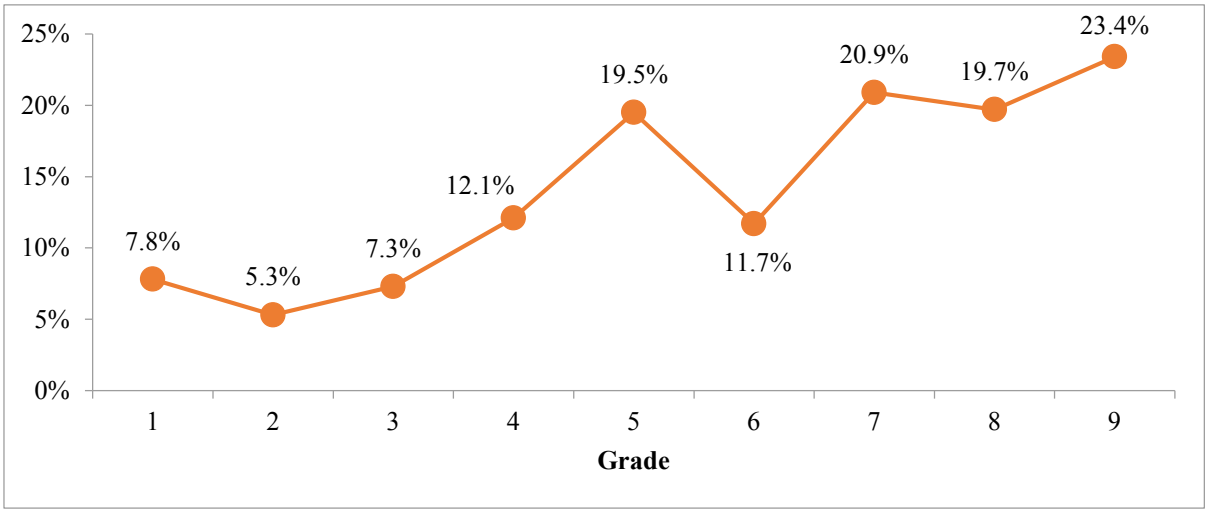
Figure 3 and Figure 4 display the estimated percentage of dropouts from 2003 to 2012 at primary and lower secondary school. The dropout rates for female students are higher in

both levels. The trend of dropout rates in the last several years reveals a slight decrease in overall dropout rate at the primary level, but not at the lower secondary level, which stays at 22% in 2012 compared to 5.7% at the primary level. This favorable trend may continue and spill over the lower secondary level if effective policy interventions are introduced and carried out.

The dropout rate by class in academic year 2012-2013 is displayed in Figure 5. The graph illustrates that the dropout rate reaches the peak at the grade 5 of primary level and is around 20% for the lower secondary grades. The high rates at the lower secondary level could be explained by two main reasons. Firstly, after the completion of primary school, on average students reach the age of 12, which for poor families, the students are able to work and support their families. This is especially true for overaged children. Secondly, because of a lack of lower secondary schools and a long distance from their villages, many students decide to give up on their lower secondary education before or after the completion of primary school. These cases tend to happen frequently in many rural areas of Cambodia (Rajani, Jennifer, & Karen, 2011). Similarly, the dropout rate at grade 9, which is a transition grade to upper secondary level, is also higher than that of grade 8.

High dropout rates at the end of primary and lower secondary levels are common in other poor countries. Lewin (2007) and Ricardo, Kwame, Jo, & Frances (2010) found that countries in Sub-Saharan Africa such as Uganda, Rwanda, Cameroon and Kenya have a high dropout rate at the end of primary and lower secondary school cycles.

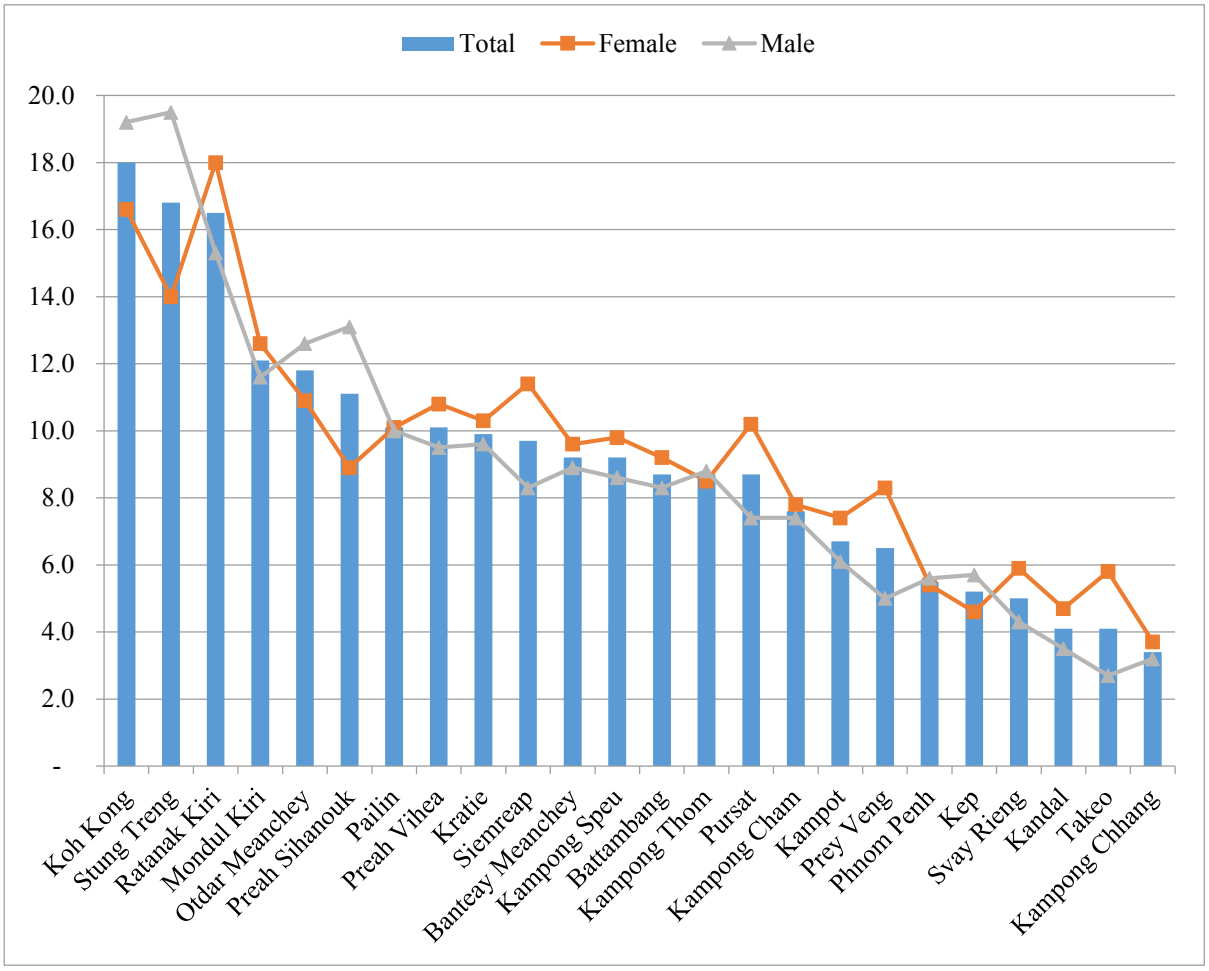
Figure 5: Dropout Rate by Class 1 to 9



Source: Author's calculation from EMIS, academic year 2012-2013

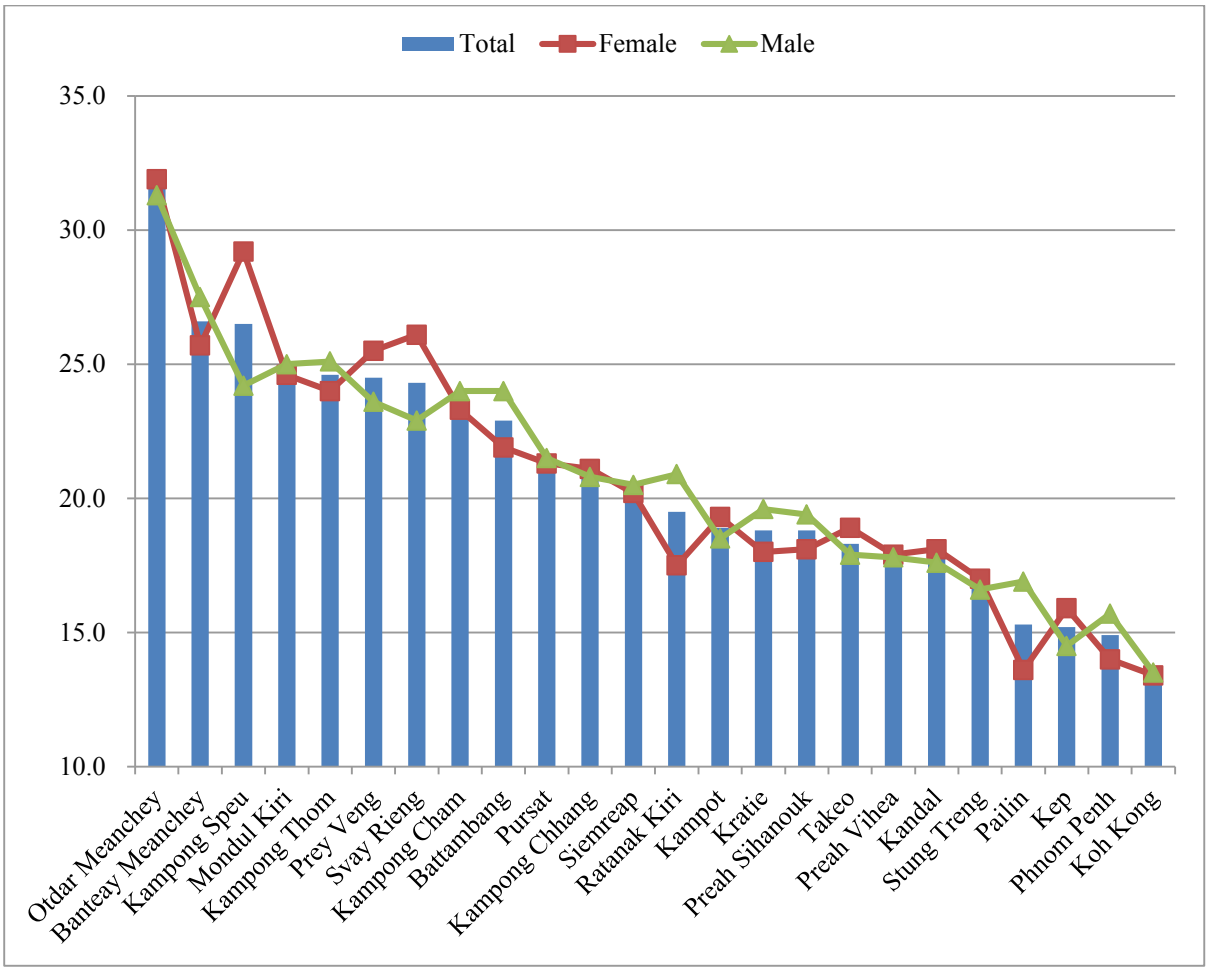
By province, the statistics from EMIS shows that dropout rates in Cambodia are relatively high in coastal and plateau regions (see Figure 6 and Figure 7). At the primal level, in academic year 2012-2013, eight provinces had two digits dropout rates including Koh Kong, Stung Treng, and RatanakKiri, which were top three with more than 15% dropout rates. In general, female dropout rates were higher in most provinces, regardless of their geographical locations, except in Koh Kong, Stung Treng, OtdarMeanchey, and Preah Sihanouk, where male dropout rates were much higher than female counterparts. Koh Kong province surprisingly had the lowest dropout rate at the lower secondary level. The top three provinces that had the highest dropout rates (more than 25%) were OtdarMeanchey, BanteayMeachey, and Kampong Speu.

Figure 6: Dropout Rate at Primary Level by Province (%)



Source: Author's calculation from EMIS, academic year 2012-2013

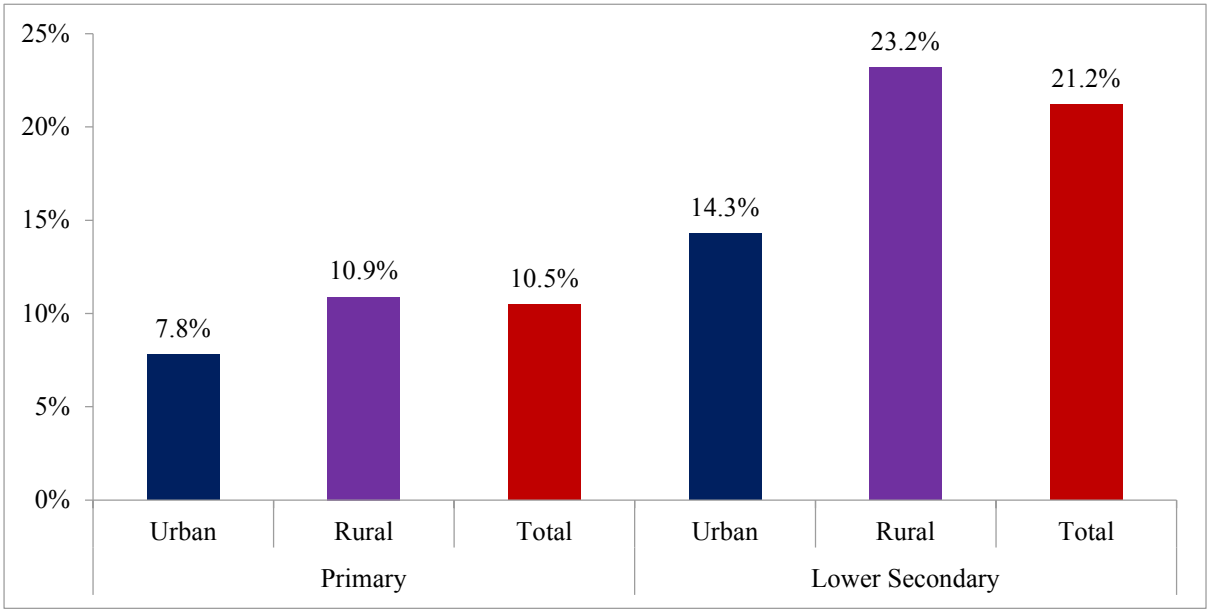
Figure 7: Dropout Rate at Lower Secondary Level by Province (%)



Source: Author's calculation from EMIS, academic year 2012-2013

In general, the dropout rates in urban areas are lower than that in rural areas. As shown in Figure 8, the dropout rate at primary level in urban area is only 7.8% compared to 10.9% in rural area. Similarly, the dropout rate at lower secondary school in urban area is only 14.3% compared to 23.2% in rural area. Such geographical difference may be explained by difference in number of the poor where a large number of them tend to live in rural area. It also reflects the difference in supply constraint because available schools in rural area tend to locate farer from home than school in urban area (see Table 7for the distance comparison in the Appendix).

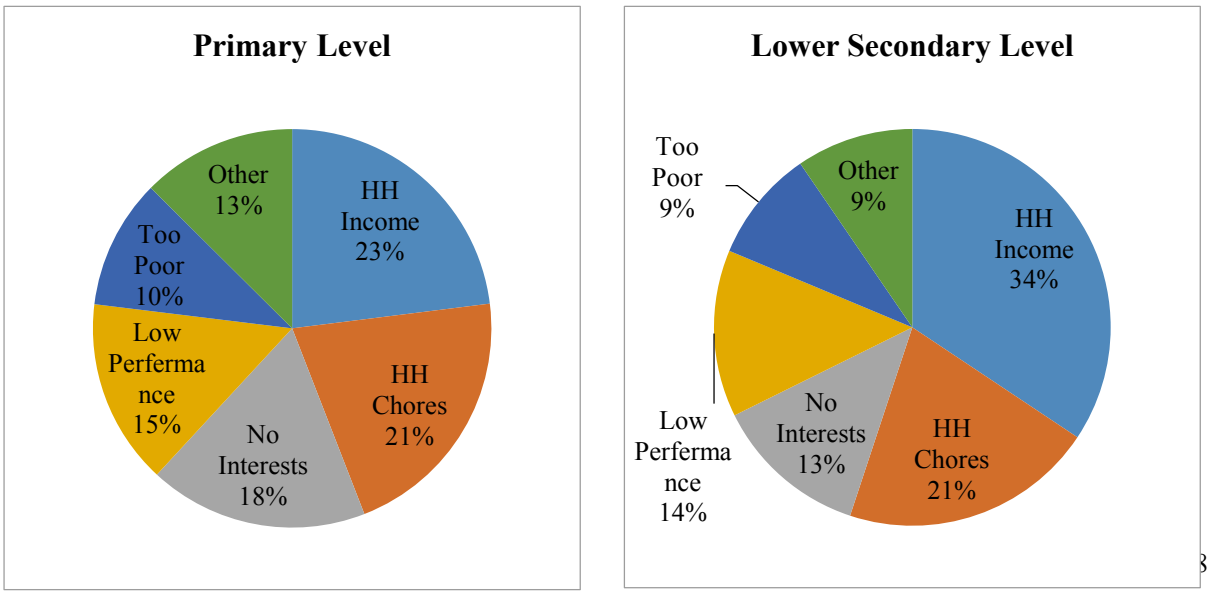
Figure 8: Dropout Rate in Urban and Rural Areas



Source: Author's compilation from EMIS

A list of factors given by respondents as the reasons for dropout is shown in Figure 9. The most contributed factors leading to school dropout based on the answers of respondents at both primary and lower secondary levels are "must contribute to household's income", "must help with household chores", "don't want to study" and "did not do well in school". All these factors account for about 80% of the reasons, which shows that household and individual factors are main determinants of school dropout in Cambodia.

Figure 9: Reasons of School Dropout



Source: Author's calculation from CSES 2003-2012

Even though the statistics from the survey shows some indicators affecting school dropout, it is not enough for policy implications because there are two limitations. Firstly, it is hard to draw the cause and effect conclusion because these factors could jointly affect or interact on dropout's decision. In this paper, the probabilistic regression method will be used to address the causes of school dropout at both primary and lower secondary levels. Secondly, the relative effect of each factor is not clear. For instance, it is significant to investigate if an income increase of 1% can reduce the probability of dropout. This question can be addressed with the regression method.

Table 1 shows the description and definitions of the independent variables to be used in this analysis. The variable "sex" is defined by female students equal to "0" and male equal to "1". The variable "age" is the age of students; "famsize" is the number of members in a household; "headedu" is the education level of household head. The variable "lnincome" is natural logarithm of monthly household income in Riels; "eduratio" is the share of education expenditure in annual household total expenditure; and finally "lnworkhrs" is the natural logarithm of working hours in the past 7 days.

Table 1: Variable Definitions

Variable	Description	Note
sex	Sex	0 = Female, 1 = Male
age	Age	
famsize	Family size	Number of Family Members
headedu	Household head's education	
lnincome	Monthly household income (Riels)	Natural Logarithm
eduratio	Share of education in annual household expenditure	Percentage Point
lnworkhrs	Working hours in the past week	Natural Logarithm

A comparison of statistics between dropout and non-dropout is shown in Table 2. The table reveals that dropouts at both primary and lower secondary schools tend to have older ages,

a larger family, and a household head with a lower education. Moreover, they tend to have a lower income and own less valuable assets, particularly land. The dropouts live in a family who on average owns about 1.5 ha, which is smaller compared to the land owned by an average family of non-dropouts, which is 2.7 ha at primary level and 1.9 ha at lower secondary level.

Table 2: Differences between Dropout and Non-dropout

		age	famsize	fathedu	mothedu	headedu	totincome	land size
Primary	Non-dropout	11.0	6.1	7.0	5.8	6.9	1,810,000	27,976
	Dropout	13.6	6.3	5.4	4.6	5.3	1,350,000	15,168
	Total	11.1	6.1	6.9	5.7	6.8	1,780,000	27,129
Urban	Non-dropout	10.7	6.0	8.7	7.0	8.2	2,660,000	16,902
	Dropout	13.4	6.3	5.6	3.9	5.7	1,660,000	16,323
	Total	10.8	6.0	8.6	6.9	8.1	2,590,000	16,865
Rural	Non-dropout	11.1	6.2	6.5	5.3	6.4	1,450,000	29,810
	Dropout	13.7	6.3	5.3	4.8	5.3	1,240,000	14,988
	Total	11.2	6.2	6.4	5.3	6.4	1,430,000	28,822
Lower Secondary	Non-dropout	14.6	6.0	7.9	6.5	7.8	2,460,000	19,503
	Dropout	15.2	6.2	5.9	4.9	5.9	1,390,000	15,169
	Total	14.7	6.0	7.6	6.2	7.5	2,290,000	18,754
Urban	Non-dropout	14.4	5.9	9.1	7.2	8.8	2,590,000	22,987
	Dropout	15.3	5.9	6.3	5.1	6.2	1,310,000	18,287
	Total	14.5	5.9	8.9	7.0	8.5	2,440,000	22,386
Rural	Non-dropout	14.7	6.1	7.0	5.9	7.0	2,350,000	18,277
	Dropout	15.2	6.3	5.8	4.8	5.8	1,430,000	14,474
	Total	14.8	6.1	6.8	5.7	6.8	2,170,000	17,563

Source: Author's calculation from CSES 2003-2012

Regression Results and Discussions

To estimate the determinants of school dropout, this study applies Probit model regressions by classifying students into urban, rural and all areas. There are several grounds to support his classification. Firstly, students who live in urban areas statistically have a lower probability of dropout at both primary and lower secondary levels, as shown in the descriptive statistics section. In rural areas, especially in remote area where poverty trap is common, the need for daily survival reduces incentives of many children to pursue their study to a higher level. In addition, the number of schools, especially at lower secondary level, is substantially lower in rural areas. Secondary schools are usually located in the provincial or district towns far away from villages. As a result, many children drop out of school after finishing primary education in their village schools.

It should be noted that the sample size for the urban areas are substantially smaller than other areas after the classification. The small sample size slightly affects the significant levels and marginal effects of each coefficient in the primary level model, but significantly biases (underestimates the coefficient and overestimates the standard errors of) those statistics in the urban area model of the lower secondary level regressions as shown below.

Primary Level

At primary level, Table 3 shows the results of Probit model, and Table 4 shows the marginal effects of each coefficient. Probit and Logit models provide similar results[4]. The regression results show that male students are less likely to drop out of school than female students. As shown in Table 4, male students in urban areas have a dropout probability of 18.6% lower than female students although the coefficients are not statistically significant in general and in the rural areas.

Obviously, the potential of over age can increase the probability of dropout at primary level. The regression coefficient is positive and significant, showing a positive relationship between age and dropout probability in all three models. If the age of students increases by one year, from the average age, the probability of dropout increases by 5.2%, 7.7% and

[4] The results of Logit model are not shown in this study, but available upon request. Particularly in Column 1 of Table 7, the pseudo R^2 is the same with that of the Logit model (pseudo R^2 =0.30). Also, both Probit and Logit models' goodness-of-fits indicate that both models can correctly predict 81% of the observations However, the log likelihood of Probit model is slightly lower than that of Logit model (-158.50 versus -157.09). Therefore, we interpret the result using Probit model. However, the interpretation of Logit model is the same in term of the signs of coefficients, despite slightly different magnitudes of coefficients.

4.6% in All, Urban, and Rural areas respectively. Theoretically, older students have more potential to work than their younger counterparts, and, thus, are more likely to drop out. This phenomenon is especially more severe in the urban area, where job opportunities are more available than in the rural areas.

Family size is also an important determinant of school dropout. From the table, the coefficients in the regressions are positive and significant for both rural and all areas, which suggests that a larger family can raise the dropout probability of children, especially older children. Usually, for a poor family with a large number of children, the elder are prone to earn income to support family and provide for the younger to continue education. Moreover, a family with a large number of children also incurs a large cost of education if all children are allowed to study. According to the marginal effect in Table 4, one additional member increases the probability of dropout by around 1% for all, urban and rural areas.

Education of the household head has been found to play an important role on the education of young members in the family, as discussed in the literature. Generally, many studies have argued that a parent's education strongly affects children's education. It is believed that if parents are highly educated, the children are likely encouraged to continue their study to a higher education. One explanation is that parents with a high education tend to appreciate education and, hence, are willing to encourage their children to attain more education. In Cambodia, this is true not only for children that are currently living with both parents, but also with a single household head (with only father or mother) and with a household head as a grandparent, an uncle, an aunt, a brother, a sister and so on. This determinant is particularly important at the lower secondary level. Empirically, the coefficient of household head's education is statistically significant at lower secondary school, but not at the primary level. This reflects the fact that household head's education matters most during the decision to pursue a higher education, particularly from primary to lower secondary education.

Surprisingly, the regression results for both the primary and lower secondary levels show that although the level of household incomes is inversely related to the probability of dropout, this study fails to find any significant effects of this variable. One of the reasons for this insignificant effect is due to the deficiency of income (or expenditure) data reported by the respondents in CSES survey. It is quite common that households underestimate their

income and overestimate their expenditure during the survey interviews, apparently to withhold their economic status for fear of crimes (in relatively rich households) and expectation of financial supports (in relatively poor households).

To capture the impact of household's education expenditure share on school dropout decision, this study includes the education share of total household expenditure as one determinant. The result shows that if a household spends more on education, the probability of dropout is lower. One percent increase in education share of the household reduces the probability of dropout by around 15% in all, urban, and rural areas, which is a tremendous effect. This is also another explanation for the minimal effect of income level on dropout probability. Only the increase in education expenditure share can effectively reduce dropout probability. This is important for policy makers in terms of financial interventions such as a scholarship that directly supports expenditure on education, rather than goes directly into the total household income. The latter channel may have a small impact on the probability of dropout because a household is more likely to use that support for other purposes rather than for education. However, a scholarship that goes directly into expenditure share for education is more effective in reducing dropout.

Finally, to account for the opportunity cost of education, the model controls for the working hours of children. As suggested by many previous studies, the working hours will have a positive effect on school attendance and dropout (UNICEF, ILO, & WB, 2006; Guarcello, Lyon, &Rosati, 2004). However, there is a debate on the threshold level of working hours, beyond which students will prefer to work rather than to attend school. In Cambodia some research has found that there is such a threshold level of working hours that affects school dropout (Phoumin& Fukui, 2006; Peter, 2008). Although our result cannot identify the threshold effect, it is shown that the coefficient of working hours is positive and very significant, which shows the positive relationship between working hours and dropout probability. The marginal effect in Table 4 reveals that an hour increase in working hours from its mean value increases the probability of dropout by 4.7%, 10.8%, and 4.0% for all, urban, and rural areas respectively. This result reveal a significant finding on the role of opportunity cost for primary education in Cambodia, especially in the urban areas where job opportunities are more available.

Table 3: Determinants of Dropout Probability at Primary Level

	(1)	(2)	(3)
	All	Urban	Rural
sex	-0.106	-0.792***	-0.000
	(-0.996)	(-2.776)	(-0.003)
age	0.338***	0.334***	0.337***
	(9.645)	(3.685)	(8.683)
famsize	0.069***	0.046	0.058**
	(2.637)	(0.731)	(1.980)
headedu	-0.016	-0.023	-0.016
	(-0.890)	(-0.564)	(-0.778)
lnincome	-0.008	-0.092	0.003
	(-0.184)	(-0.755)	(0.051)
eduratio	-1.017*	-0.562	-1.275*
	(-1.838)	(-0.505)	(-1.924)
lnworkhrs	0.843***	1.282***	0.795***
	(8.875)	(4.861)	(7.647)
_cons	-8.213***	-7.324***	-8.274***
	(-8.669)	(-2.860)	(-7.898)
N	1101	162	939
pseudo R^2	0.300	0.419	0.288
AIC	733.451	127.287	600.953
ll	-358.725	-55.644	-292.477
chi2	307.773	80.146	236.622
p	0.000	0.000	0.000

Note: t statistics in parentheses, * p < 0.10, ** p < 0.05, *** p < 0.01

Table 4: Marginal Effects of the Explanatory Variables at Their Mean Values

	All	Urban	Rural
Variable	dy/dx	dy/dx	dy/dx
sex	-1.6%	**-18.6%**	0.0%
age	**5.2%**	**7.7%**	**4.6%**
famsize	**1.0%**	1.1%	**0.8%**
headedu	-0.3%	-0.5%	-0.2%
lnincome	-0.1%	-2.1%	0.0%
eduratio	**-15.5%**	-12.9%	**-17.6%**
workhrs	**4.7%**	**10.8%**	**4.0%**

Lower Secondary Level

Table 5 shows the results of Probit model, and Table 6 shows the marginal effects of each coefficient for the lower secondary level. As discussed above, we take precautions in interpreting the results in the urban area because the sample size is a bit small, only 88 observations.

Unlike the primary level, the regression results show that sex is not a significant determinant of student dropout at the lower secondary level. However, Table 5shows an interesting contrast between roles of gender in the urban and rural areas. In general and in the rural areas, male students have a lower dropout probability than female students do although the coefficients are not statistically significant, yet the former seem more likely to drop out than the latter in the urban area. Over age can also increase the probability of dropout. Similar to the primary level, if the age of students increases by one year, from the average age, the probability of dropout increases by 5.3% and 5.0% in all and rural areas, respectively, although the marginal effect in the urban area is minimal probably due to the

sample issue. Older students, at the lower secondary level, have much more potential to work than their younger counterparts, and, thus, are more likely to drop out.

Family size is again an important determinant of school dropout at the lower secondary level. From the table, the coefficients in the regressions are positive and significant for both rural and all areas, which suggests that a larger family can raise the dropout probability of children. According to the marginal effect in Table 6, this variable has a stronger impact on dropout probability than at the primary level. As discussed above, the burdens faced by households at the primary level are even heavier for households at the lower secondary level. One additional member has been found to increase the probability of dropout by around 2.5% and 3.7% for students in all and rural areas, which comparatively much higher in the case of primary level.

Education of the household head has been found to play an important role on the education of young members in the family, as discussed. This determinant is more pronounced at the lower secondary level. The coefficient of household head's education is statistically significant at lower secondary school in all, urban and rural areas, but not significant at the primary level. This reflects the fact that household head's education matters most during the decision to pursue a higher education, particularly from primary to lower secondary education.

Reinforcing the results at the primary level, the result shows one percent increase in education share substantially reduces dropout probability by around 40% in all and rural areas at the lower secondary level. Finally, it is shown that the coefficient of working hours is positive and very significant. The marginal effect reveals that an hour increase in working hours at the lower secondary level increases dropout probability of by 12.2%, 0.8%, and 11.6% for all, urban, and rural areas respectively. This result is even more alarming than at the primary level and shows that the role of opportunity cost for lower secondary education in Cambodia is non-negligible.

Table 5: Determinants of Dropout Probability at Lower Secondary Level

	(1)	(2)	(3)
	All	Urban	Rural
sex	-0.020	0.410	-0.102
	(-0.123)	(0.692)	(-0.573)
age	0.198**	0.424	0.164**
	(2.569)	(1.292)	(2.004)
famsize	0.094**	-0.151	0.121***
	(2.268)	(-0.793)	(2.690)
headedu	-0.101***	-0.238*	-0.093***
	(-3.477)	(-1.905)	(-2.860)
lnincome	-0.002	-0.272	0.022
	(-0.023)	(-1.059)	(0.306)
eduratio	-1.492**	-1.364	-1.362**
	(-2.342)	(-0.583)	(-1.978)
lnworkhrs	1.249***	3.675***	1.040***
	(8.308)	(3.686)	(6.591)
_cons	-7.502***	-13.029*	-6.856***
	(-4.311)	(-1.744)	(-3.683)
N	377	88	289
pseudo R2	0.301	0.708	0.242

AIC	333.015	44.285	285.276
ll	-158.508	-14.142	-134.638
chi2	136.415	68.428	85.979
p	0.000	0.000	0.000

Note: *t* statistics in parentheses, * *p*< 0.10, ** *p*< 0.05, *** *p*< 0.01

Table 6: Marginal Effects of the Explanatory Variables at Their Mean Values

	All	Urban	Rural
Variable	dy/dx	dy/dx	dy/dx
sex	-0.5%	0.3%	-3.1%
age	**5.3%**	0.2%	**5.0%**
famsize	**2.5%**	-0.1%	**3.7%**
headedu	**-2.7%**	**-0.1%**	**-2.8%**
lnincome	0.0%	-0.2%	0.7%
eduratio	**-39.6%**	-0.8%	**-41.1%**
workhrs	**12.2%**	**0.8%**	**11.6%**

6. Conclusion and Policy Recommendation

The study empirically found that main factors of school dropouts in Cambodia are closely related to student and, more importantly, family characteristics. For student factors, over aged children are more likely to drop out of school. From the analysis, if age increases by one year from the average age, the probability of dropout increases by around 5%. Older

students tend to have a higher opportunity cost than their younger counterparts because their labor potential is an important pulling factor, especially for poor families. From our empirical analysis, opportunity cost significantly affects school dropout probability because working children are more likely to leave school than non-working children. Working children tend to drop out of school when they graduate from primary school and are about to enter a lower secondary school. Gender disparity is also a concern based on our empirical result. Although it is not significant, female students have a slightly higher probability of school dropout than male students.

Family characteristics play an important role in students' decision to drop out. Firstly, students with a larger family size are more likely to drop out than those with a smaller family size. In a poor family with many members, the elder children are usually expected to earn income to support their family and younger ones to continue their education. Moreover, families with a large number of children also incur a large cost of education if all children were allowed to study. Secondly, students whose parents or household heads have a low education are more probable to leave school. One explanation is that parents with a high education tend to value education and, hence, encourage their children to attain a higher education, and vice versa.

Last family factor that affects students' decision is the share of household expenditure on education. A higher share of household's expenditure on education reduces the probability of school dropout. Households usually spend more on other purposes rather than education when their income increases. Interestingly, the level of household income does not have a significant impact on students' decision. This suggests that financial intervention such as a scholarship that directly goes into overall income may has little impact on the probability of dropout because of the fungibility issue; households are more likely to use the new income source for other purposes rather than for education. The policy implication from this finding is that if a scholarship is given directly to cover education expenditure, it will likely help in reducing dropout.

Stemming from the above findings, the following policy recommendations are suggested to tackle the dropout issue in Cambodia:

1. Policies with financial, mental, consulting supports for student groups with high probability of dropout and their families are needed. These groups include:

    - Students live in a poor family
    - Working students, especially students whose family is poor and family size is large
    - Students live in rural areas, particularly female students
    - Students whose parents do not well understand the importance of education.
    - Public awareness on benefit of education for uneducated and less educated parents is needed.

2. More incentives and financial supports to teachers, students, and school staffs for a visit to convince families of the dropout back to school will help reduce dropout rate. This is consistent with recommendationsby ADB and MoEYS on School Based Enrichment Program (MoEYS and ADB, 2012).

3. Education expenditure still has a strong effect on family decision relating to children education, mainly poor families. Financial supports such as an increase of scholarship allowances to students with a high risk of dropout will be effective although the efficient amounts should vary between primary and lower secondary levels. However, it is important to ensure that the purpose of scholarship is toward education.

4. Encourage the integration of dropout issues into local authority development plan with clear targeted goals such as development and budget plans of the Sangkat or Commune.

5. Improve coordination between local authorities, schools, and families to jointly solve dropout issues; and public awareness on dropout issue should target areas with high rates of lower secondary school dropout.

6. Improving school environment, curriculum quality, and teacher quality are always needed and are a continuing process to encourage students staying at

school. Curriculum should be updated in response to market and social demand so that parents will value the future benefits of education.

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Appendix

Table 7: Average Distance to Nearest School in Kilometer

	distance to nearest primary school	distance to nearest lower secondary school
non-dropout	1.12	2.83
dropout	1.20	3.08
Total	1.12	2.85

Source: Author's calculation from CSES 2003-2012

Table 8: Overall pooled effect sizes by outcome and intervention type

Interventions Type	Enrolment	Attendance	Dropout	Progression	Maths	Language	Global
Teacher Resources	0.233** 2	0.090*** 4	0.090** 3		0.292** 5	0.284** 5	-0.016 3
Buildings	0.403** 4	0.377** 3	0.419 2	0.201 1	0.505** 2	0.383** 2	
Health	0.291 1	0.216** 8	0.032 2	0.384*** 1	0.350 5	0.173 4	-0.032 1
CCT	0.217*** 16	0.198*** 8	0.111*** 4	0.165** 4	-0.018 2	-0.029 1	0.054 3
ECD	0.0198*** 3				0.420*** 2	0.514*** 2	0.020 1
Materials		0.047 8	0.216 2	0.000 1	0.160*** 10	0.204 9	0.112 2
SBM	0.082 3	-0.024 3	0.237 3	0.058** 3	0.227*** 3	0.118 2	0.195*** 1
School Feeding	0.156** 3	0.210 5	0.449*** 2	0.69*** 1	0.060 4	0 4	0.02 1
Vouchers	0.028 1				-0.121 2	-0.351 2	
School Fees	0.019 2	0.63*** 1			0.133*** 1		
Providing Information	0.031 2	-0.103 2	-0.007 2		0.402 2	0.048** 2	0.031 2
Pooled							

Source: Shari et al (2013), page 46

Note: *p<0.1, **p<0.05 and ***p<0.001